

National park research engages future scientists participating in *JASON XIV: From Shore to Sea*

By Yvonne Menard

new reserves. That fish, lobster, and conch populations had diminished to alarming levels was not in doubt. Studies by park staff and U.S. Geological Survey (USGS) scientists had contributed greatly to understanding how fishery resources and reef fish assemblages had declined dramatically from overfishing, illegal harvest, and ongoing mortality from discarded fish nets and traps. Two recent joint studies by Dr. Caroline Rogers of the USGS and Dr. Jim Beets of Jacksonville University identified low biomass and low numbers of species and individuals of finfish and shellfish. Ironically, Rogers and Beets reached the conclusion that species composition and numbers of fish, lobsters, and conch are no greater inside Virgin Islands National Park, where one would expect greater species protection, than outside park boundaries.

Scientific collaborations and interagency partnerships will continue to be critically important to park managers in evaluating the efficacy and performance of the recently created reserves. For example, Buck Island Reef and scientists with the National Oceanic and Atmospheric Administration's (NOAA) National Center for Coastal and Ocean Science Biogeography Program have been collaborating since January 1999 to map and document benthic habitats and marine species in the existing and expanded Buck Island Reef area. They will intensify their work, using a NOAA research vessel (March 2004), equipment, and scientists, with additional funding from the NPS Natural Resource Preservation Program beginning in FY 2005. Virgin Islands Coral Reef National Monument plans similar surveys of fish and invertebrate populations. These efforts will evaluate coral health, document previously harvested species of fish and marine invertebrates, and shed light on their possible recovery in the reserves.

All the Virgin Islands parks are highly popular destinations for tourists to enjoy beautiful landscapes above and below water. Each is developing general management plans (GMPs) beginning in 2004. Development of GMPs and outreach and education will be critical to designing the shared future of these parks in collaboration with fishers, local communities, the tourism industry, and the Virgin Islands territorial government. ■

cliff_mccreedy@nps.gov

Marine Management Specialist, Water Resources Division; Washington, D.C.

STUDENTS FROM AROUND THE WORLD went on a virtual science expedition to the California Channel Islands in 2003 with world-renowned oceanographer and explorer Dr. Robert Ballard. Known as *JASON XIV: From Shore to Sea*, the year-long study adventure highlighted research and science at Channel Islands National Park and National Marine Sanctuary, and more than 1.6 million middle and elementary school students and 35,000 teachers participated.

Ballard started the JASON Project in 1989 after receiving more than 16,000 requests from students who asked to go with him on his next expedition following the RMS *Titanic* discovery. The JASON Project, designed to engage students in science and technology, has been proven to motivate them to take a greater interest in scientific careers. Its multimedia components include a standards-based curriculum, interactive live satellite broadcasts, hands-on field research, professional development for teachers, classroom exercises, and an award-winning website.

During *JASON XIV*, students used cutting-edge technology to discover the marine and terrestrial ecosystems, geology, archeology, and cultural history of the Channel Islands. The national park became a living laboratory, a setting to stimulate young minds, a place to engage in research.

Students from around the globe interacted via a two-way satellite link with researchers on Anacapa Island and at the Santa Barbara Maritime Museum. During two weeks in December and January they participated in more than 55 live satellite broadcasts, at least one of which was aired daily on the National Geographic Channel. Through the broadcasts students in the classroom had the opportunity to monitor urchins in the kelp forest, study a recovering island ecosystem, and immerse in the traditions of the native Chumash.



Addressing JASON Argonauts worldwide, guest researcher Jean-Michel Cousteau recounts the technological advances in diving equipment that have allowed scientists to gain a better understanding of ocean resources and direct conservation efforts.

natural resource education



Broadcasting live, *JASON XIV* host and oceanographer Dr. Robert Ballard and his Argonaut cohort (top) facilitate interaction of students around the world and researchers in the field at Channel Islands National Park and the Santa Barbara Maritime Museum. During a two-week period, the *JASON* Argonauts, alongside researchers, explored underwater kelp forests at the park, immersed in native Chumash culture, reviewed the history of diving, and applied remote sensing tools to ecological monitoring on Anacapa Island.

Designed to engage students in science and technology, the *JASON* Project modeled its field activities in 2002/2003 after actual resource monitoring being conducted at Channel Islands National Park. In one exercise Argonauts (above) compared real-time ocean temperature data relayed from a radio-controlled NASA airplane with those collected by divers at the park and satellites. Rich in biodiversity, kelp forests thrive in cool water and are monitored at the national park.

Assisting Dr. Ballard, a select group of students, teachers, and researchers hosted the broadcast via satellite and the Internet. Alongside researchers, these student Argonauts answered questions on Web chats and posted daily journals. They were the first to test a brand-new Uninhabited Aerial Vehicle (UAV), created for the *JASON* Project by NASA's Goddard Space Flight Center. The Argonauts compared and analyzed data collected by the UAV, space satellites, and underwater instruments. The UAVs were outfitted with a thermo-infrared imager, which measured heat output and translated it into black and white images, allowing students to detect changes in sea surface temperatures or survey the kelp beds and sea lion rookeries.

Alongside national park marine biologist David Kushner, students monitored the health of subtidal species and debated the reasons for establishing marine reserves. Stimulated by the efforts of park terrestrial biologist Tim Coonan to save the endangered island fox, teams of students used a Web-based ecology simulation game to develop their own fox recovery plan.

This project was created and supported by a phenomenal partnership among the *JASON* Foundation for Education, Channel Islands National Park and National Marine Sanctuary, NASA, the Santa Barbara Maritime and Natural History Museums, the University of California, and Ventura and Santa Barbara County schools. A National Park Foundation grant sponsored more than 70 local teachers and their students, providing them with the *JASON* curriculum. These local schools continue to develop innovative ways to use the content-rich *JASON XIV* curriculum. The *JASON* Project has become the backbone of one school's Gifted and Talented Education program. Another school offers *JASON XIV* as an elective science course. An evaluation conducted by the Educational Development Center for Children and Technology found that the teaching methods used by the *JASON* Project increased students' abilities to understand scientific concepts and manipulate data, improving critical thinking and communication skills.

“Students in the classroom had the opportunity to monitor urchins in the kelp forest, study a recovering island ecosystem, and immerse in the traditions of the native Chumash.”

The national park environment gave these budding scientists a chance to step out of the classroom and into an outdoor lab, an opportunity to explore the natural world. In the words of Tano Cabugos, a 13-year-old Argonaut of Chumash descent, “I want to help the ocean, and the more I can learn ... the better I can help.” After scuba-diving in the island kelp forest, Tano said, “Everything is so alive and every movement you make affects everything around you. Since I was four, I wanted to be a marine biologist. That dive was just incredible. Underwater, I felt like I was in outer space, just so aware of my body and the whole world around me. I can't wait to get down there and explore.” ■

yvonne_menard@nps.gov

Chief of Interpretation, Channel Islands National Park, California